

AMENDMENT TO THE CLAIMS

1. (currently amended) A method for inspecting portion of a substrate to be inspected, the method comprising:

generation of N multi-pixel incident electron beams;

directing the N multi-pixel incident electron beams through N beam separators in a first direction;

focusing the N multi-pixel incident electron beams onto N areas of the substrate;

~~directing N multi-pixel incident beams respectively onto N multi-pixel areas on the substrate;~~

directing electrons emitted from the N areas through the N beam separators in a second direction so as to separate the emitted electrons from the incident beams;

detecting the emitted electrons emitted from the N areas using N multi-pixel detector arrays in a parallel manner; and

translation of the substrate in a path that covers approximately 1/N of the portion of the substrate to be inspected.

2. (original) The method of claim 1, wherein the portion of the substrate to be inspected comprises all integrated circuit dies on a wafer.

3. (original) The method of claim 1, wherein the portion of the substrate to be inspected comprises a fraction of dies on a wafer.

4. (currently amended) An inspection system for inspecting a specimen, the system comprising:

a plurality of electron sources, each said source configured to generate a multi-pixel incident beam;

a plurality of objective lenses, each said objective lens configured to focus a multi-pixel incident beam onto a corresponding region of the specimen, wherein impingement of said incident beam causes emission of electrons from the region;
and

~~a plurality of columns for directing a plurality of multi-pixel incident beams onto a plurality of multiple-pixel regions of the specimen, wherein impingement of said incident beams causes emission of electrons from the regions; and~~

a plurality of multiple-pixel electron detectors, each said detector configured to detect in parallel those electrons emitted from a plurality of pixels in ~~one of the regions~~ corresponding region; and

a plurality of beam separators, each said separator configured to direct one of the multi-pixel incident beams in a first direction from a corresponding electron source to a corresponding objective lens and to direct said emitted electrons in a second direction from the corresponding objective lens to a corresponding multiple-pixel electron detector.

~~a plurality of processing sub-systems, each said sub-system configured to process data from one of said detectors.~~

5. (currently amended) The system of claim 4, further comprising a translation mechanism for translating the wafer under said plurality of incident beams such that the corresponding regions ~~plurality of regions~~ are scanned across the wafer.

Claims 6-8. (canceled)

9. (currently amended) A method for inspecting substrates with increased throughput to detect defects in at least one patterned layer thereon, the method comprising:

~~providing directing a plurality of multi-pixel incident beams onto a plurality of multiple pixel areas on a substrate, wherein each said beam impinges on a different said area;~~

directing the incident beams towards a surface of a substrate;

emission of electrons due to impingement of the incident beams onto corresponding areas of the surface;

bending said emitted electrons towards a plurality of multi-pixel detector arrays so as to separate said emitted electrons from the incident beams;

detecting in parallel said emitted electrons ~~electrons emitted from the plurality of from said areas~~ using the plurality of detector arrays; and

processing in parallel data collected from the plurality of areas by the plurality of detector arrays.

10. (canceled)

11. (original) The method of claim 9, further comprising:

translation of the substrate in a path such that the plurality of incident beams are scanned across the surface of the substrate.

12. (currently amended) The method of claim 11, wherein the plurality of incident beams comprises N incident beams, and wherein an inspected area during the translation comprises approximately N times an area covered by ~~[[the]]~~ a translation path of a single incident beam.

13. (original) The method of claim 12, wherein N is at least two.
14. (original) The method of claim 13, wherein N is no more than fifty.
15. (original) The method of claim 9, wherein at least one incident beam comprises incident electrons.

Claims 16-17. (canceled)

18. (original) The method of claim 9, wherein the processing in parallel comprises comparison of the collected data from each area with another set of data.

19. (original) The method of claim 18, wherein the comparison comprises alignment, differencing, filtering, and defect location.

20. (currently amended) An electron-emission inspector apparatus having increased throughput for inspecting semiconductor wafers, the apparatus comprising:

a first column for directing a first multi-pixel incident beam onto a first multiple-pixel region of a wafer, wherein impingement of said first incident beam causes emission of electrons from the first region so as to generate a first multi-pixel emitted beam;

a first multiple-pixel electron detector configured to detect in parallel ~~electrons emitted from a plurality of pixels in the first region~~ pixels of the first multi-pixel emitted beam;

a first beam separator in the first column which is configured to separate the first multi-pixel emitted beam from the first multi-pixel incident beam;

a second column for directing a second multi-pixel incident beam onto a second multiple-pixel region of the wafer, wherein impingement of said second incident beam causes emission of electrons from the second region so as to generate a second multi-pixel emitted beam; [[and]]

a second multiple-pixel electron detector configured to detect in parallel ~~electrons emitted from a plurality of pixels in the second region~~ pixels of the second multi-pixel emitted beam; and

a second beam separator in the second column which is configured to separate the second multi-pixel emitted beam from the second multi-pixel incident beam.

21. (original) The apparatus of claim 20, further comprising:

a first processor system for processing data from said first detector to inspect for defects; and

a second processor system for processing data from said second detector to inspect for defects.

22. (currently amended) The apparatus of claim 21, further comprising a translation system for translating the wafer under said first and second incident beams such that the first and second multiple-pixel regions are scanned across the wafer.

23. (currently amended) The apparatus of claim 20, wherein the first and second incident beams each comprises incident electrons, and wherein the

first and second columns each further comprise an objective lens ~~and a beam separator device~~.

Claims 24-26. (canceled)

27. (original) The apparatus of claim 23, wherein the electrons emitted from the first and second regions comprise secondary electrons.